

Monitoring Study Group Meeting Minutes

February 13, 2008

CAL FIRE Shasta-Trinity Unit Headquarters

The following people attended the MSG meeting: George Gentry (BOF—chair), Tharon O'Dell (GDRCO), Brian Barrett (CAL FIRE), Clay Brandow (CAL FIRE), Jim Ostrowski (BOF), Stuart Farber (Timber Products Co.), Shane Cunningham (CAL FIRE), Curt Babcock (DFG), Matthew House (GDRCO), Mike Fuller (CGS), Kevin Faucher (CTM), Mike Gaedeke (Cal Poly/OSU), Angela Wilson (CVRWQCB), Matt Boone (CVRWQCB), Debra Hallis (CVRWQCB), Drew Coe (CVRWQCB), Dennis Hall (CAL FIRE), Dr. Richard Harris (UCB), Dr. Michael Wopat (CGS), Dr. Cajun James (SPI), Richard Gienger (HWC/SSRC), and Pete Cafferata (CAL FIRE). **[Action items are shown in bold print]**.

We began the meeting with general monitoring-related announcements:

- Pete Cafferata announced that the CLFA Spring Workshop titled: "Hydrologically Invisible Workshop: Erosion and Sediment Control for Timberland," will be held on March 6th and the CLFA Annual Conference, "Successful Forestry – What is Working Well", will be held on March 7th and 8th, both in Sacramento. Numerous MSG participants are speakers in both sessions. More information is available at: <http://www.clfa.org/workshops.htm>.
- CAL FIRE, DFG, CGS, and RWQCBs are holding two RPF/Landowner watercourse crossing workshops on March 11th in Redding and May 14th in Willits. Pete Cafferata is the contact for more information (pete.cafferata@fire.ca.gov).
- DFG and CAL FIRE are holding two training workshops on policies and procedures DFG uses to review THPs on February 21st-22nd in Redding and March 19th-20th in Jackson. The contact for the March session is Tina Bartlett (TBartlett@dfg.ca.gov).
- A conference titled "Vegetation Management in Sensitive Areas of the Lake Tahoe Basin: A Workshop to Evaluate Risks and Advance Existing Strategies and Practices" was held on February 20-22nd at the Tahoe Center for Environmental Sciences, Incline Village, Nevada.
- Clay Brandow announced that the SWRCB is holding its 4th Biannual Non-Point Source Pollution Conference in San Diego on May 5th-7th. More information is available at: <http://www.swrcb.ca.gov/nps/conference2008.html>.
- Richard Gienger announced that the 26th Annual Salmonid Restoration Conference will be held on March 5-8th in Lodi. More information is available at: www.calsalmon.org.
- Brian Barrett announced that the Society of American Foresters (SAF) National Convention will be held in Reno on November 6th-9th. More information is available at: <http://www.safconvention.org/natcon%2D08/?CFID=379122&CFTOKEN=78204301>
- Angela Wilson stated the BOF's Ad Hoc Road Rules Committee is finishing work on a new version of their proposed rule package and that they will be making a presentation to the BOF at their March meeting.
- A detailed implementation guide to Turbidity Threshold Sampling (TTS) by Jack Lewis and Rand Eads is in the final stages of publication as a USFS-PSW General Technical Report. An unofficial pre-publication layout is available for downloading from the USFS-PSW TTS web site at: http://www.fs.fed.us/psw/topics/water/tts/TTS_GTR_prepub.pdf.
- A new paper in the Journal of the North American Benthological Society (January 2008) titled "Quantitative Linkages Among Sediment Supply, Streambed Fine Sediment, and Benthic Macroinvertebrates in Northern California Streams" by Matthew Cover, Christine May, Bill Dietrich, and Vince Resh is available at: <http://csmres.jmu.edu/geollab/may/web/Research/Reprints/cover%20et%20al%202008%20ina bs.pdf>. This UC Berkeley study was conducted on six streams in the Klamath Mountains.

Sediment Production on Forest Road Surfaces in the Redwood Region

Brian Barrett, CAL FIRE—JDSF, provided the MSG with a PowerPoint presentation on sediment production on forest road surfaces in Jackson Demonstration State Forest (JDSF) for hydrologic years 2006 and 2007. The study and PowerPoint were completed by both Brian and Dr. David Tomberlin, NOAA Fisheries. A similar presentation and paper were given at the SAF National Convention in Portland in October 2007 (the paper is available upon request from Brian at: brian.barrett@fire.ca.gov). This “pilot” study was supported by a \$65,000 grant from NOAA Fisheries over two years, since there were no previous road surface erosion data in the literature for the redwood region to use in road erosion models (e.g., SEDMODL2, WEPP). Two main research questions were asked: (1) how much erosion is occurring on forest road surfaces in the redwood region?, and (2) how suitable is this study’s approach for studying road surface erosion in this region? Brian provided some background information on how road erosion can adversely impact fish, water quality, and road function. He stated that better information on road surface erosion is needed for sediment budget construction and for management decisions related to the relative efficacy of different road treatments.

The settling basin/tipping bucket method described by Black and Luce (2007—available at: <http://www.fs.fed.us/GRAIP/downloads/New%20road%20plot%20v3.pdf>) was used at 10 existing, hydrologically isolated road segments on JDSF. Flow from the inside ditch of a well defined road segment was routed through a cross drain culvert and into a large settling basin (48 inch diameter, sealed upright culvert section), where coarse sediment settled out of suspension. Excess flow out of the settling basin passed through a tipping bucket with an event logger to estimate total runoff, and a flow splitter permitted subsamples of runoff to be collected for total suspended solids (TSS) determination. Coarse sediment in the settling basin was weighed with a crane scale or by manual excavation with buckets. Settling basins and tipping buckets were constructed by CAL FIRE’s Parlin Fork Conservation Camp for approximately \$1,700 per instrument (materials only—not labor). The tipping buckets were calibrated at the beginning and end of each year. Hobo dataloggers recorded the number of bucket tips during a storm event.

The study sites are underlain by Coastal Belt Franciscan Complex-derived clay loam soils located in the Caspar Creek (4 road segments), Chamberlain Creek (5 segments) and South Fork Noyo River (1 segment) watersheds. Roads selected for study were crowned with an inside ditch and a cross drain culvert. The Caspar Creek roads were rocked, while the South Fork Noyo and Chamberlain Creek roads were not surfaced. Information on winter traffic use (none or light), percent of ditchline vegetated (0 to 75%), road grade (4 to 9%), surface area draining to the inside ditchline, road length, and recent road grading were recorded for each segment studied.

Hydrologic year (HY) 2006 was considerably wetter than HY 2007 (147% of normal vs. 74%). Daily precipitation exceeded 2 inches 6 days in HY 2006, compared to 2 days in HY 2007. There were 15 coarse sediment weighing in HY 2006 and 11 in HY 2007. During HYs 2006 and 2007, a total of 196 and 70 TSS samples were taken, respectively. Mean TSS the first year was 539 mg/l and 396 mg/l the second year. The highest sediment producing road segments were unsurfaced during the first year. TSS values were generally lower the second year, except where there was recent inside ditchline grading--particularly for a rocked road segment in the Caspar Creek watershed. Total sediment production normalized by road surface area and segment length showed high rates for three unrocked segments during HY 2006. Overall, sediment production ranged from 0 to 5 kg m⁻² yr⁻¹, with a mean of approximately 1.6 kg m⁻² in HY 2006 and 0.4 kg m⁻² in HY 2007. The WEPP model predicted

roughly $4 \text{ kg m}^{-2} \text{ yr}^{-1}$ (WEPP was modeled for JDSF Rd 630 by Ish and Tomberlin (2007)—see: http://www.fs.fed.us/psw/publications/documents/psw_gtr194/psw_gtr194_68.pdf). Fine sediment generally made up between 30 and 90 percent of the total amount collected.

The limited number of replications and variety of topographic conditions did not allow meaningful statistical analysis of the relationships between sediment production and segment characteristics. The first year results suggested that the rocked roads in this study produced less sediment than the native-surface roads, but road grading operations made this distinction less clear the second year. The proportions of coarse and suspended sediments varied considerably among the 10 sites, with both rocked and unrocked segments producing high relative proportions of both fine and coarse sediment. The proportion of suspended sediment was generally greater in the second year, perhaps due to lower runoff that moves coarse sediment. Overall, there was very high variability over time and among sites.

There were several complicating factors in this study, including equipment failures, limited vandalism, and a few data logger files that were overwritten. The study was characterized as being very labor intensive and expensive. Data is continuing to be collected this year, which will complete the pilot project phase. **Dr. Tomberlin will write a final technical report for NOAA Fisheries. Brian and David would like to find a graduate student interested in continuing the project.**

During discussion following the PowerPoint presentation, Drew Coe stated that the erosion rates measured in JDSF are very comparable to the numbers found in the published literature for other forested areas. His work in the central Sierra Nevada with silt fence measurements documented an average sediment production of approximately $\sim 0.3 \text{ kg m}^{-2} \text{ yr}^{-1}$ for unsurfaced roads, while additional graduate student research in the southern Sierra has produced an estimate of $\sim 0.7 \text{ kg m}^{-2} \text{ yr}^{-1}$ for native and mixed surface roads and $\sim 0.2 \text{ kg m}^{-2} \text{ yr}^{-1}$ for surfaced roads. Drew's work also showed that recent grading has a large impact on sediment, doubling sediment production. There was considerable discussion and debate regarding how well models such as WEPP and SEDMODL2 perform predicting sediment yields from forest roads, with general consensus that they are not good at estimating absolute sediment yield numbers during normal precipitation years, but that they can be valuable for understanding erosion processes operating in watersheds.

CGS Pilot Road Inventory Project for Jackson Demonstration State Forest

Mike Fuller, CGS, gave a PowerPoint presentation on the CGS pilot road inventory project completed for Jackson Demonstration State Forest. In total, JDSF has approximately 500 miles of roads, and the newly adopted JDSF Management Plan calls for a complete road inventory within three years. The pilot project was designed to aid in the development of useful road inventory protocols that can be used as part of JDSF's Road Management Plan. The goal was to produce a rapid method that was highly repeatable. The methodology and associated GIS database developed earlier by CGS for California State Parks was the starting point for this pilot. The final report for the project and Mike's PowerPoint are both posted on the MSG website at: http://www.fire.ca.gov/CDFBOFDB/board/msg_archives.asp.

Mr. Fuller stated that a major objective of the project was to demonstrate a comprehensive data management system that could cover every phase of the operation, including collection, storage, retrieval, updating, and publishing. The road data management system was designed to: (1) support analyses, budgeting, short and long-term monitoring; (2) integrate with other data streams; (3) facilitate data development; (4) build a reference library of studies, standard drawings, photos; (5) provide observations and recommendations across a

range of scales; and (6) provide a framework for an overall road management plan. The key field data features inventoried for the data management system were: road segment data (0.25 to 1 mile), watercourse crossing data (198 crossings on 15 miles of road), perched fill data, information on the condition of landings, and data that could be used to estimate sediment savings associated with mitigations. Four data tables were created from the database, along with queries that draw from all four tables.

Field measurements for the pilot project road inventory were made on approximately 15 miles of road (Rds 450, 453, and 454) in the Hare Creek watershed in 2006. Data collected and compiled into the data system included air and field photos, specific reports (e.g., past landslide reports), soils data, DEM and LIDAR data, and stream network data. Field data were recorded by using a nested series of three forms: a General Data Log, a detailed Road Segment Summary form, and a detailed Watercourse Crossing Description form. Mike displayed the General Data Log form, where all relevant field features were recorded as encountered along the road. Items of particular interest were features related to erosion, construction design, maintenance, geology, and infrastructure. The focus was on features that either represented problems that are amenable to treatment or features/conditions that may represent constraints or design criteria. Distances along passable roads were generally measured with the odometer on the quad runner used. A hip chain (string box) was used as a secondary means for segments that were impractical for ATV use or for deviations from the route, such as spurs, or for other ancillary distance measurements. To maintain the integrity of the road log, it was imperative to restrict the use of the ATV odometer for sequential distances along the route. Backtracking or off-route deviations were travelled by foot and measured by the string box. For the desired mapping scale of 1:10,000, features less than a hundred feet long were treated as points and corresponding distances were either paced or measured with the string box, since they were too small to accurately determine from the odometer.

Road segments, watercourse crossings, landings, and other erosion features were ranked as either high, moderate, or low. The rank was subjectively assigned based on the likely reduction in sediment yield or hazard that repair or rehabilitation could provide. Mr. Fuller displayed the detailed Road Segment Summary and Watercourse Crossing Description forms, which were cross-referenced to the General Data Log (to protect data integrity, a data dictionary defined permissible data terminology). The detailed forms were designed for rapid and consistent data collection and integration into the GIS. The forms included, where appropriate, lists of pre-defined data variables that could be selected by circling the desired choices. In the office, the data was transferred into the GIS using data entry forms that corresponded to the field forms. The one-page Road Segment Summary form allows the field observer to rapidly record data on over 100 different variables (circling choices). The two-page Watercourse Crossing Description form was also shown, which allows consistent data collection, including fill measurements and illustrations. After data input, use of the GIS database allowed the production of various thematic maps and calculations, such as fill volume and cumulative distances.

The GIS organization of the data management system was then explained. GIS and the geo-database serves as the hub for new and existing data, including: (1) data that may be collected in the future; (2) spatial and statistical analyses; (3) various erosion models; (4) document-ready graphs, tables, maps; and (5) linear and spatial coordinates. "Linear" referencing was used for this project to keep distances accurate over the 15 miles of road inventoried. The data organization scheme is flexible and can grow as new information is developed. With the data entered, it is easy for trained database operators to generate thematic maps of road segments, crossings, landings, treatment areas, erosion features,

infrastructure, and composite maps. This type of spatial database greatly simplifies the task of viewing and sorting data. Examples were shown how field and aerial photos, as well as special studies, are hyperlinked to the data. A quick, accurate overall picture of the road system can be easily produced with composite maps, illustrating where problem sites are that must be repaired. For example, of the 198 crossings inventoried, approximately 60% were fully functioning, 20-30% had moderate problems, and 10% had significant problems (coded on the map as green, yellow and red). Mitigation queries are available, displaying the types of treatments recommended for high priority sites. This system is particularly good for tracking management activities over time. Long-term documentation is difficult without a GIS database system.

There was considerable interest from the group regarding the database system Mike described, since company RPFs are attempting to track road improvement work over time for a variety of reasons (HCP requirements, TMDLs, etc.). Mike stated that field crews in the pilot could cover two miles per day per person, and that the total cost (including planning, preparation, travel and GIS work) was \$1,500 to \$1,900/mile, but that there are abundant opportunities to streamline work and reduce costs in a non-pilot project situation.

Brief MSG Monitoring and Tracking Subcommittee Update

Pete Cafferata very briefly summarized MSG Monitoring and Tracking Subcommittee work. The group's second conference call was held on January 22nd, with 11 people participating. The subcommittee's goal continues to be to identify agency monitoring requirements, locate areas of redundancy, and reach agreement on the most effective ways of reorganizing monitoring efforts. In addition, the group is discussing ways to summarize monitoring data and make it available to the public. The majority of the second call was spent reviewing the draft Excel spreadsheet on forestry-related monitoring activities prepared in February 2007 by CAL FIRE staff. The subcommittee discussed each type of monitoring listed individually and offered suggestions for additions and corrections, including both new monitoring entities and corresponding monitoring work performed by that entity. **A revised Excel spreadsheet and narrative have been prepared and emailed to the group. The next subcommittee conference call is scheduled for February 25th.**

Brief MSG Interagency Mitigation Monitoring Program (IMMP) Subcommittee Update

Pete Cafferata provided a rapid summary of recent MSG IMMP activities. The MSG IMMP Subcommittee met on January 16th in Willows. The group discussed the revised IMMP watercourse crossing protocols developed and tested by the Coast and Inland teams during the second phase of the IMMP pilot project during 2007. DFG's Joe Croteau and Angela Wilson described progress made on developing the IMMP pilot project Access relational database, which will be populated with data collected in 2007. **It was agreed that the IMMP Subcommittee will complete a final report for the IMMP pilot project by the end of June 2008.** Information on the database and query results will be included, as well as language describing the value of the IMMP "process." The group developed an outline for the report and made writing assignments. Finally, Dennis Hall reviewed a CAL FIRE memorandum dated January 14, 2008 that summarizes: (1) IMMP development, (2) pilot project accomplishments, (3) concerns with the program, and (4) recommendations to address concerns for the long-term program. **The next IMMP Subcommittee meeting is scheduled for February 29th.**

Brief update on the FORPRIEM Monitoring Program

Clay Brandow quickly summarized the status of CAL FIRE's FORPRIEM monitoring program. Approximately a third of CAL FIRE Forest Practice Inspectors have been trained to use the revised monitoring protocols since last fall. **FORPRIEM training for remaining CAL FIRE Forest Practice Inspectors in the Humboldt, Sonoma, Santa Cruz, Butte, and Lassen-Modoc Units will resume in the spring of 2008.** Additionally, CAL FIRE watershed staff are working with the CAL FIRE IT section to develop a FORPRIEM database.

Brief BOF Technical Advisory Committee (TAC) Update

Pete Cafferata provided a brief description of the BOF's TAC work. The TAC was formed to oversee a scientific literature review of studies pertinent to riparian buffers and functions. It developed a list of key questions for a Board-appointed contractor to focus on in the literature for each riparian function. Bids for the TAC contract were submitted by Sound Watershed Consulting and Start Watershed Consulting in January. The TAC selected Sound Watershed Consulting at its January 10th meeting. The lead consultant is Mike Liquori, with assistance for the project to be provided by Dr. Lee Benda (wood, sediment), Dr. Bob Coats (hydrology, nutrients), and Dr. Doug Martin (fisheries). CALFIRE supported the TAC's first choice for the contractor at the full price (slightly less than \$130,000). A formal letter of award for the contract has been sent to Sound Watershed Consulting. **The TAC is planning a meeting with the contractor in March.**

New and Unfinished Business—Cooperative Instream Monitoring Project Updates

Very brief updates were provided for three of the MSG's cooperative instream monitoring projects. Mike Gaedeke summarized work on the Little Creek watershed study located on Swanton Pacific Ranch in the Santa Cruz Mountains. Mike and Dr. Brian Dietterick are collecting the last pre-treatment data this winter prior to logging under an NTMP in the summer of 2008. There will be six years of pre-treatment data for the four main stem stations, while the five new stations on small headwater streams will have two winters of pretreatment data. Additionally, a new LIDAR flight will take place in 2008.

Kevin Faucher updated the group on work in the South Fork Wages Creek watershed located in Mendocino County. He stated that the project began in 2004, so considerable pre-logging data will exist when harvesting begins—possibly in 2010. Campbell Timberland Management probably will go to the BOF to seek experimental status for the watershed. Kevin displayed a preliminary logging plan for the South Fork watershed that includes a control sub-basin, a selection or transition silviculture area near the main stream channel, and several small clearcut units located above a new mid-slope road. The existing road up the South Fork channel will be abandoned. A northern spotted owl site exists at the base of the watershed. Rand Eads, RiverMetrics, is now providing consulting assistance for the study. He has suggested using bed-mounted booms for the turbidimeters located at the three automated instream monitoring stations.

Cajun James reviewed the status of the Judd Creek cooperative monitoring study located in Tehama County. She stated that the four monitoring stations with fiberglass flumes continue to work well. The logging plan for the study has been approved (Engelbrechtsen THP) and specifies that there will be 41 clearcut units covering 816 acres (13% of the total watershed area; the average clearcut size is 20 ac). New road construction and road abandonment work was completed in 2007 and logging will begin in 2008. While there have been several storms this winter, no large discharge events have occurred. Hydrologic year 2006 produced the

highest peak discharges during the life of the study, with flow rates of approximately 120 cfs. Cajun invited the Monitoring Study Group to visit the study area at a future field meeting.

Public Comment

Richard Gienger stated that it would be appropriate to establish a timeline tying the MSG Monitoring and Tracking Subcommittee work products to the Coho Salmon Incidental Take Assistance rule package monitoring requirements.

Next MSG Meeting

The next Monitoring Study Group meeting is planned for the Lake Tahoe Basin to see water quality-related monitoring occurring in the basin, particularly related to the 2007 Angora Fire. The meeting may last one and a half days. While tentative dates were selected, it appears likely that the meeting will be rescheduled for mid-May. When exact dates and an agenda are available, they will be emailed to the group.